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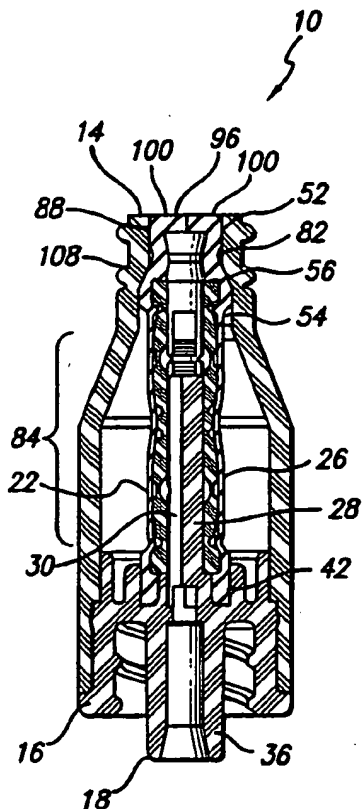
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- (51) International Patent Classification?: A61M 39/26, 39/10, 39/16 (72) Inventors: LEINSING, Karl, R.; 2805 Bishopgate Drive, Raleigh, NC 27613 (US). MOSLER, Theodore, J.; 231 Ridgewood Drive, #720, Raleigh, NC 27609 (US).
- (21) International Application Number: PCT/US00/20162 (74) Agents: RUNK, Thomas, A. et al.; Fulwider Patton Lee & Utecht, LLP, 6060 Center Drive, Tenth Floor, Los Angeles, CA 90045 (US).
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- (26) Publication Language: English
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(54) Title: NEEDLELESS MEDICAL CONNECTOR WITH EXPANDABLE VALVE MECHANISM



(57) Abstract: A needleless connector (10) for medical use, adapted to facilitate the flow of fluid therethrough, includes a housing (12) having an inlet port (14) and an outlet port (18). The connector (10) also includes a flex-tube assembly (22) defining a fluid path between the inlet port (14) and the outlet port (18). The flex-tube assembly (22) is movable between uncompressed and compressed states. The flex-tube assembly (22) has a first internal volume when in the uncompressed state and a second internal volume, greater than or substantially equal to the first internal volume, when in the compressed state.

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patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/20162

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61M39/26 A61M39/10 A61M39/16

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 26835 A (ICU MEDICAL INC) 25 June 1998 (1998-06-25)	1-4, 12, 13, 16, 28, 29, 33, 37-46
A	the whole document, especially abstract page 5, line 24 -page 7, line 12 page 7, line 34 -page 9, line 27 page 18, line 13 - line 24 page 19, line 27 -page 20, line 35; claims 1-6, 9, 10, 13-15, 18; figures 4, 5, 16, 17, 20, 21  --- -/-	5-7, 18, 20

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
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- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*G\* document member of the same patent family

Date of the actual completion of the international search

17 May 2001

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25. 05. 2001

Name and mailing address of the ISA

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# INTERNATIONAL SEARCH REPORT

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 24090 A (CRITICAL DEVICE CORP) 20 May 1999 (1999-05-20) the whole document, especially abstract page 4, line 24 -page 5, line 23 page 8, line 6 - line 12 page 10, line 7 - line 27 page 13, line 16 -page 15, line 27 page 15, line 33 -page 24, line 16; claims 1,2,15; figures 1-5	1-3
Y		4-7,12, 13,20, 21,24, 28,29, 33,37-46
A		16,18
Y	US 5 676 346 A (LEINSING KARL R) 14 October 1997 (1997-10-14) cited in the application  the whole document	4-7,12, 13,20, 21,24, 28,29, 33,37-46
X	WO 94 22522 A (MEDEX INC) 13 October 1994 (1994-10-13) page 8, line 17 - line 21 page 10, line 6 - line 20 page 12, line 10 -page 13, line 26 page 16, line 6 - line 23 figures 1,3,6A,6B	47,48
X	US 4 810 241 A (ROGERS PHILLIP P) 7 March 1989 (1989-03-07) column 3, line 62 -column 4, line 19 column 5, line 43 -column 6, line 5 figures 3,10	47
X	US 5 195 994 A (DIERINGER FRANZ A) 23 March 1993 (1993-03-23) column 4, line 61 -column 5, line 30 figure 1	47

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 00/20162

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-46

Relating to a medical connector with an expandable valve mechanism.

2. Claims: 47,48

Relating to a medical connector with an antimicrobial agent.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/20162

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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